

VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a Major, Municipal permit. The effluent limitations contained in this permit will maintain the Surface Water Quality Standards of 9 VAC 25-260. The proposed discharge will result from the operation of a municipal sewage treatment plant (SIC Code: 4952 - Sewerage Systems). This permit action consists of reissuing the permit with revisions to the permit, as needed, due to changes in applicable laws, guidance, and available technical information.

1. Facility Name and Address:
Mt. Sidney WWTP
PO Box 859
Mt. Sidney, VA 22842
Location: 2075 Lee Highway, Mt. Sidney
2. Permit No. VA0022322; Expiration Date: September 30, 2011
3. Owner: Augusta County Service Authority
Contact Name: Ken Fanfoni
Title: Executive Director
Telephone No: 540.245.5670
4. Description of Treatment Works Treating Domestic Sewage:
Total Number of Outfalls – Existing: 1; Proposed: 0

Mt. Sidney WWTP receives sewage wastewater generated by residents and businesses in the communities of Mt. Sidney and Fort Defiance with the balance of the flow generated by commercial contributors. The treatment units comprising the WWTP are shown in the schematic included in the permit reissuance application.

Average Discharge Flow = 0.075 MGD

Design Average Flow = 0.15 MGD

5. Application Complete Date: March 10, 2011

Permit Writer: Brandon Kiracofe

Date:

Reviewed By: Dawn Jeffries

Date:

Public Comment Period: _____ to _____

6. Receiving Stream Name: Middle River, UT
River Mile: 2.48
Use Impairment: No
Special Standards: pH
Tidal Waters: No
Watershed Name: VAV – B23R Lower North River
Basin: Potomac; Subbasin: Shenandoah
Section: 4; Class: IV
7. Operator License Requirements per 9 VAC 25-31-200.C: Class III
8. Reliability Class per 9 VAC 25-790: Class II (assigned October 18, 1979)

Fact Sheet – VPDES Permit No. VA0022322 – Mt. Sidney WWTP

9. Permit Characterization:

- ☐ Private ☐ Federal ☐ State ☒ POTW ☐ PVOTW
☐ Possible Interstate Effect ☐ Interim Limits in Other Document (attach copy of CSO)

10. Discharge Location Description and Receiving Waters Information: Appendix A

11. Antidegradation (AD) Review & Comments per 9 VAC 25-260-30:

Tier Designation: Middle River, UT: Tier 1

The State Water Control Board's Water Quality Standards (WQS) includes an AD policy. All state surface waters are provided one of three levels of AD protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The AD policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with a Tier determination. Middle River, UT in the immediate vicinity of Outfall 001 is determined to be a Tier 2 water because there are no data available that indicate water quality criteria (WQC) either have been violated or are barely met. Since the quality of Tier 2 waters is better than that required by the standards, no significant degradation of the existing quality will be allowed. Because there was no proposed expansion for this existing discharge, antidegradation baselines were not calculated for any toxic parameters. If this permit action had included an expansion of the design capacity for this facility, then baselines would have been calculated for all parameters as not more than 25% of the unused assimilative capacity of the criteria for the protection of aquatic life (acute and chronic) and not more than 10% for the protection of human health. The unused assimilative capacity is defined as the difference between existing water quality and the criterion for a specific pollutant.

Based on the modeling performed during the last reissuance, the DO antidegradation baseline has been determined to be 5.3 mg/L.

12. Site Inspection: Performed by Bill Maddox on August 12, 2010

13. Effluent Screening and Effluent Limitations: Appendix B

14. Whole Effluent Toxicity (WET) Program Requirements per 9 VAC 25-31-220.D: Appendix B

15. Biosolids utilization and disposal options include the following:

- land application by Houff's Feed & Fertilizer Company under their VPA Permits

16. Bases for Special Conditions: Appendix C

17. Material Storage per 9 VAC 25-31-280.B.2: This permit requires that the facility's O&M Manual include information to address the management of wastes, fluids, and pollutants which may be present at the facility, to avoid unauthorized discharge of such materials.

18. Antibacksliding Review per 9 VAC 25-31-220.L: This permit complies with Antibacksliding provisions of the VPDES Permit Regulation.

19. Impaired Use Status Evaluation per 9 VAC 25-31-220.D: Middle River, UT in the vicinity of the discharge is not listed as impaired; however, Middle River is listed as impaired for bacteria. A TMDL addressing the bacteria impairment includes the following WLA for this discharge:

E. coli: 2.61×10^{11} cfu/yr (based on a design flow of 0.15 MGD and a concentration of 126 cfu/100 mL)

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20. Regulation of Users per 9 VAC 25-31-280.B.9: N/A – This facility is owned by a municipality.
21. Storm Water Management per 9 VAC 25-31-120: Application Required? ☒ Yes ☐ No
The permittee submitted an updated No Exposure Certification Form with their application that indicates there are no industrial activities or materials exposed to storm water discharged from the property. No Exposure Certification is approved as part of the permit reissuance. No storm water requirements have been included in the permit.
22. Compliance Schedule per 9 VAC 25-31-250: There are no compliance schedules included in the reissued permit.
23. Variances/Alternative Limits or Conditions per 9 VAC 25-31-280.B, 100.J, 100.P, and 100.M: The applicant requested a waiver for sampling fecal coliform at Outfall 001 and all parameters at Outfall 002. Approval of this waiver request was received from EPA.
24. Financial Assurance Applicability per 9 VAC 25: N/A – This facility is owned by a municipality.
25. Virginia Environmental Excellence Program (VEEP) Evaluation per § 10.1-1187.1-7: At the time of this reissuance, is this facility considered by DEQ to be a participant in the Virginia Environmental Excellence Program in good standing at either the Exemplary Environmental Enterprise (E3) level or the Extraordinary Environmental Enterprise (E4) level? ☒ Yes ☐ No
26. Nutrient Trading Regulation per 9 VAC 25-820: See Appendix B
General Permit Required: ☒ Yes ☐ No
27. Threatened and Endangered (T&E) Species Screening per 9 VAC 25-260-20 B.8: Because the permit includes an expansion flow tier for which T&E screening has not been previously performed, T&E screening was performed in accordance with Guidance Memo No. 07-2007. The USFWS screening indicated that the Madison Cave isopod, which is a federally listed threatened species, is present in Rockingham County; however, the DGIF screening did not indicate the presence of state or federally listed threatened or endangered species or designated Threatened or Endangered Species Waters within the mixing zone or within 2 miles of the discharge location and that are hydrologically connected to the receiving waters. The DCR screening indicated natural heritage resources in the project area. The project was sent to DCR for review. DCR provided the following comments which were forwarded to the permittee for their consideration.

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

This project either overlies or is adjacent to a karst landscape characterized by sinkholes, caves, disappearing streams, and large springs. If such features are encountered during the project, please coordinate with Wil Orndorff (540-394-2552, Wil.Orndorff@dcr.virginia.gov) to document and minimize adverse impacts. Discharge of runoff to sinkholes or sinking streams, filling of sinkholes, and alteration of cave entrances can lead to surface collapse, flooding, erosion and sedimentation, groundwater contamination, and degradation of subterranean habitat for natural heritage resources. If the project involves filling or "improvement" of sinkholes or cave openings, DCR would like detailed location information and copies of the design specifications. In cases where sinkhole improvement is for stormwater discharge, copies of VDOT Form EQ-120 will suffice.

Our files do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

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Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Shirl Dressler at (804) 367-6913.

28. Public Notice Information per 9 VAC 25-31-280.B: All pertinent information is on file, and may be inspected and copied by contacting Brandon Kiracofe at: DEQ-Valley Regional Office, P.O. Box 3000, Harrisonburg, Virginia 22801, Telephone No. (540) 574-7807, brandon.kiracofe@deq.virginia.gov.

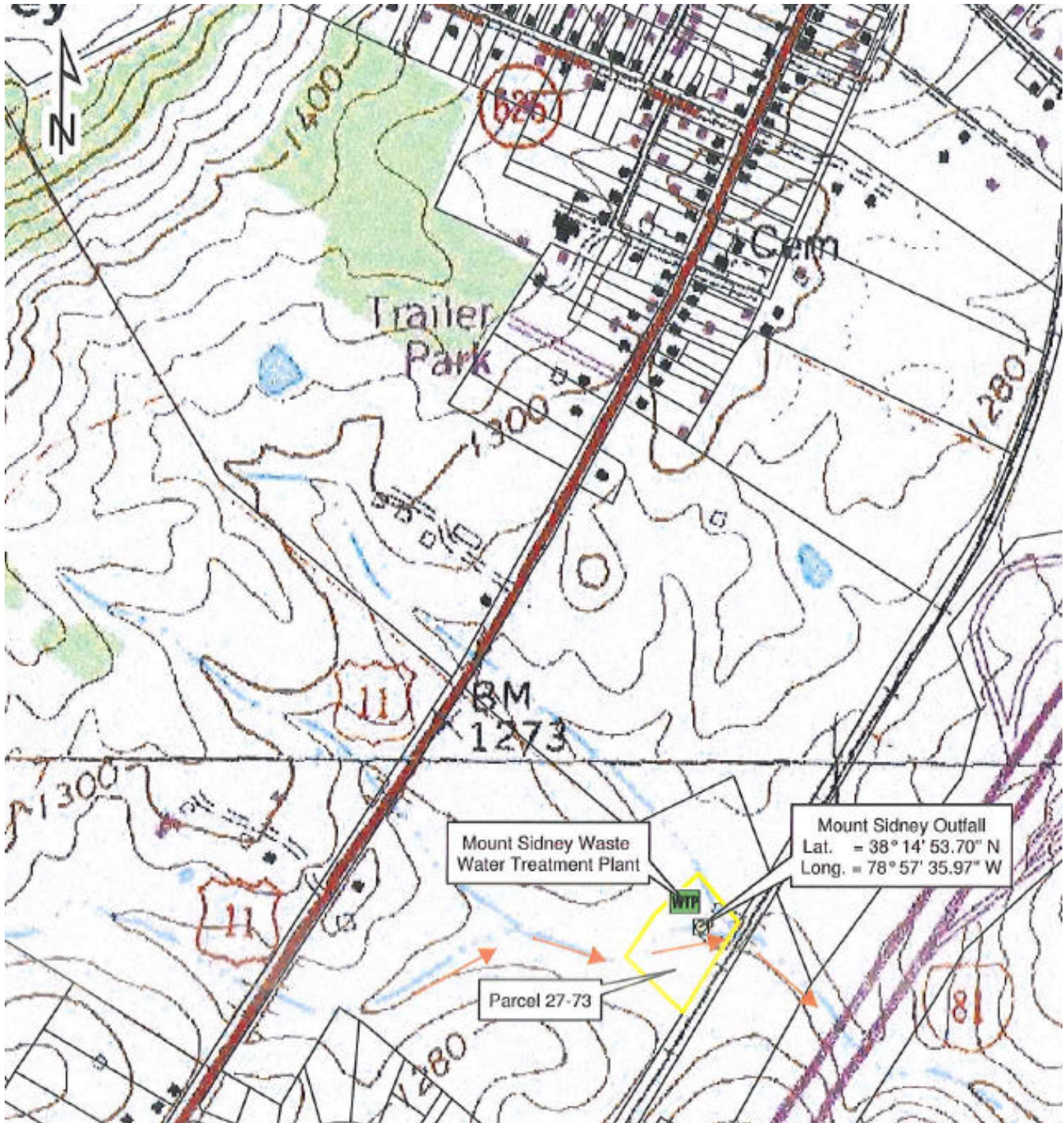
Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given.

29. Historical Record: The original permit was issued December 22, 1974. The design flow was 0.1 MGD, and the permit limited BOD₅ and Suspended Solids. The permit was reissued on October 1, 1976, and modified on November 9, 1979 to include a design flow of 0.15 MGD which included additional limits for Dissolved Oxygen and pH.

APPENDIX A

DISCHARGE LOCATION AND RECEIVING WATERS INFORMATION

Mt. Sidney WWTP discharges to Middle River, UT in Augusta County. The topographical map below shows the location of the treatment facility and Outfall 001.



Fact Sheet – VPDES Permit No. VA0022322 – Mt. Sidney WWTP

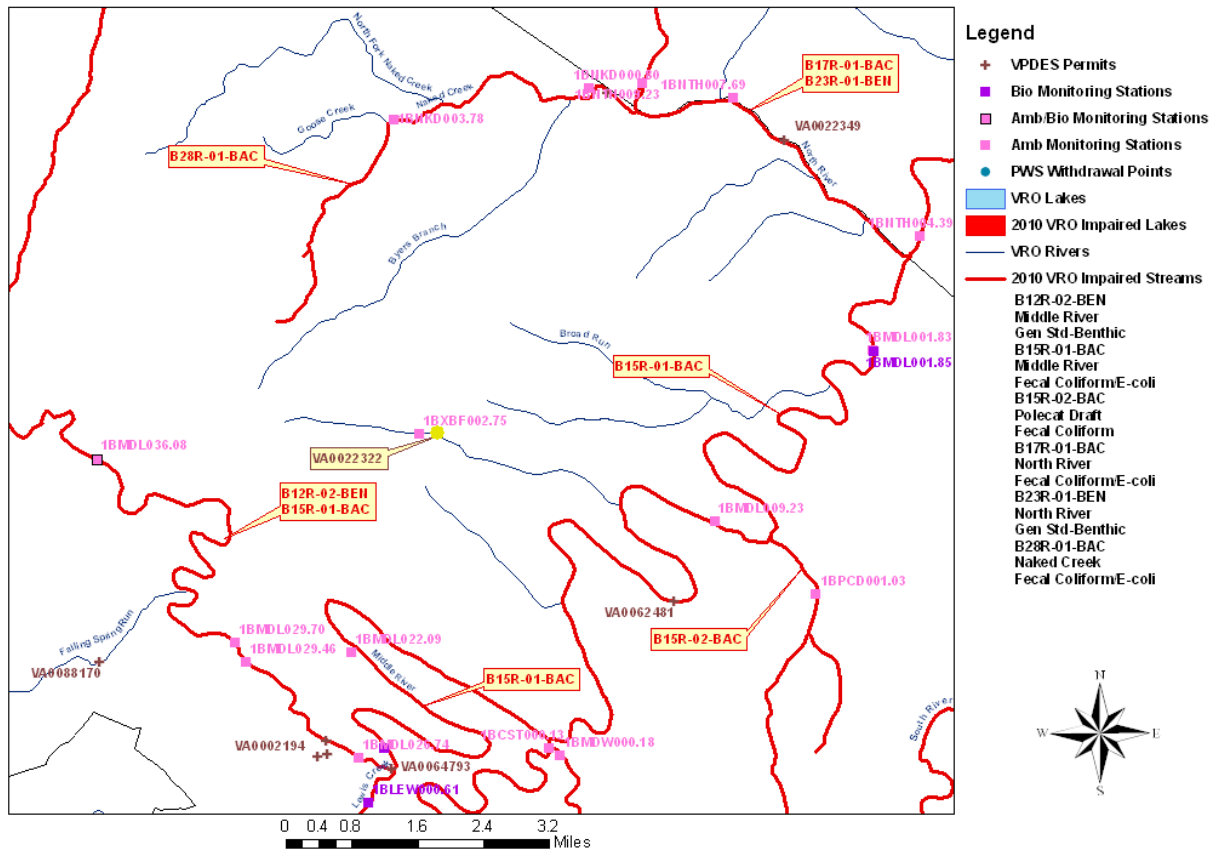
PLANNING INFORMATION

Relevant points of interest within the watershed and in the vicinity of the discharge are shown on the Water Quality Assessment TMDL Review table and corresponding map below.

WATER QUALITY ASSESSMENTS REVIEW						
POTOMAC-SHENANDOAH RIVER BASIN						
4/6/2011						
IMPAIRED SEGMENTS						
SEGMENT ID	STREAM	SEGMENT START	SEGMENT END	SEGMENT LENGTH	PARAMETER	
B12R-02-BEN	Middle River	40.23	17.56	22.67	Benthic	
B15R-01-BAC	Middle River	43.06	0.00	43.06	Fecal Coliform, E-coli	
B15R-02-BAC	Polecat Draft	7.42	0.00	7.42	Fecal Coliform	
B17R-01-BAC	North River	24.96	0.00	24.96	E-coli, Fecal Coliform	
B23R-01-BEN	North River	16.32	0.00	16.32	Benthic	
B28R-01-BAC	Naked Creek	6.85	0.00	6.85	E-coli, Fecal Coliform	
PERMITS						
PERMIT	FACILITY	STREAM	RIVER MILE	LAT	LONG	WBID
VA0022322	Mt. Sidney WWTP	Middle River X Trib	2.48	381452	0785734	VAV-B15R
VA0002194	American Safety Razor_001	Middle River X Trib	0.37	381129	0785904	VAV-B12R
VA0002194	American Safety Razor_002	Middle River	27.84	381138	0785905	VAV-B12R
VA0002194	American Safety Razor_003	Middle River X-trib	0.48	381128	0785912	VAV-B12R
VA0022349	Weyers Cave STP	North River	6.91	381756	0785254	VAV-B23R
VA0062481	New Hope STP	Middle River	12.55	381305	0785425	VAV-B15R
VA0088170	Verona WTP	Falling Spring Run	1.62	381228	0790207	VAV-B12R
VA0088188	Weyers Cave WTP	Naked Creek X-Trib	0.038	381827	0785516	VAV-B28R
MONITORING STATIONS						
STREAM	NAME	RIVER MILE	RECORD	LAT	LONG	
Middle River	1BMDL001.85	1.85	7/91	381542	0785143	
Middle River	1BMDL026.58	26.58	2/15/02	381133	0785819	
Middle River	1BMDL036.08	36.08	05/17/79	381437	790208	
Middle River	1BMDL026.74	26.74	4/22/06	381127	0785839	
North River	1BNTH009.23	9.23	3/13/06	381833	0785448	
Middle River	1BMDL001.83	1.83	04/30/79	381543	0785144	
Middle River	1BMDL022.09	22.09	9/23/99	381234	0785844	
Middle River	1BMDL029.46	29.46	9/23/99	381228	0790009	
Naked Creek	1BNKD000.80	0.8	07/01/91	381830	0785531	
Polecat Draft	1BPCD001.03	1.03	07/01/93	381309	0785231	
Middle River X-Trib	1BMBF002.75	2.75	7/1/99	381452	0785749	
Christians Creek	1BCST000.13	0.13	7/2003	381132	0785606	
Meadow Run	1BMDW000.18	0.18	7/2003	381128	0785557	
North River	1BNTH007.69	7.69	5/11/01	381823	0785335	
Middle River	1BMDL029.70	29.7	7/2001	381240	0790180	
Middle River	1BMDL009.23	9.23	7/2001	381355	0785352	
Naked Creek	1BNKD003.78	3.78	7/8/03	381810	0785808	
PUBLIC WATER SUPPLY INTAKES						
OWNER	STREAM	RIVER MILE				
None						
WATER QUALITY MANAGEMENT PLANNING REGULATION						
Is this discharge addressed in the WQMP regulation? No						
If Yes, what effluent limitations or restrictions does the WQMP regulation impose on this discharge?						
PARAMETER	ALLOCATION					
WATERSHED NAME						
VAV-B15R Lower Middle River						

Fact Sheet – VPDES Permit No. VA0022322 – Mt. Sidney WWTP

Mt. Sidney WWTP - Water Quality Assessments Review April 6, 2011



Fact Sheet – VPDES Permit No. VA0022322 – Mt. Sidney WWTP

FLOW FREQUENCY DETERMINATION

MEMORANDUM
DEPARTMENT OF ENVIRONMENTAL QUALITY
VALLEY REGIONAL OFFICE

4411 Early Road – P.O. Box 3000

Harrisonburg, VA 22801

SUBJECT: Flow Frequency Determination
Mt. Sidney WWTP – VPDES Permit No. VA0022322, Augusta County

TO: Permit Processing File

FROM: Brandon Kiracofe

DATE: April 1, 2011

Mount Sidney STP discharges to an unnamed tributary of Middle River near Mount Sidney, VA. Stream flow frequencies are required at this site for use by the permit writer in developing effluent limits for the VPDES permit reissuance.

The VDEQ conducted flow measurements on the unnamed tributary (trib. #3) from 1996 to 2000. The measurements were made above the Mount Sidney STP outfall. The measurements were correlated with the same-day daily mean values from the continuous record gage on Kerrs Creek near Lexington, VA (#02022500). The period of record for the Kerrs Creek gage is from 1926 to present. The correlation was made by plotting the measurements and the daily mean values on a log/log graph, and performing a regression analysis. A best-fit line (and equation) for the data set was established. The required flow frequencies for Middle River, UT at the Mount Sidney STP discharge point were then calculated using the equation of the line and the flow frequencies for the entire period of record of the Kerrs Creek gage. The flow frequencies for the Kerrs Creek gage and the calculated flow frequencies for the measurement site/discharge point are presented below. The values at the discharge point do not address any discharges, withdrawals, or springs that may influence the flow in Middle River, UT upstream of the discharge point.

Reference Gage

Kerrs Creek near Lexington, VA (#02022500):

Drainage Area = 35.0 mi²

1Q30 = 3.8 cfs	High Flow 1Q10 = 6.2 cfs
1Q10 = 4.4 cfs	High Flow 7Q10 = 7.3 cfs
7Q10 = 4.8 cfs	High Flow 30Q10 = 9.1 cfs
30Q10 = 5.3 cfs	HM = 14 cfs
30Q5 = 6.0 cfs	

Measurement Site /Discharge Point

Middle River, UT (trib. #3) at Mount Sidney, VA (#01624940):

Drainage Area = 0.25 mi²

1Q30 = 0.056 cfs (0.036 MGD)	High Flow 1Q10 = 0.11 cfs (0.069 MGD)
1Q10 = 0.068 cfs (0.044 MGD)	High Flow 7Q10 = 0.13 cfs (0.085 MGD)
7Q10 = 0.076 cfs (0.049 MGD)	High Flow 30Q10 = 0.18 cfs (0.11 MGD)
30Q10 = 0.087 cfs (0.056 MGD)	HM = 0.31 cfs (0.20 MGD)
30Q5 = 0.10 cfs (0.066 MGD)	

The high flow months are January through May.

REVIEWER: JRD DATE: 4/4/11

Fact Sheet – VPDES Permit No. VA0022322 – Mt. Sidney WWTP

EFFLUENT/STREAM MIXING EVALUATION

Mixing zone predictions were made with the Virginia DEQ Mixing Zone Analysis Version 2.1 program. The predictions are based on the discharge and receiving stream characteristics, and are presented below.

0.09 MGD Annual Mix	0.15 MGD Annual Mix
Effluent Flow = 0.09 MGD Stream 7Q10 = 0.049 MGD Stream 30Q10 = 0.056 MGD Stream 1Q10 = 0.044 MGD Stream slope = 0.009 ft/ft Stream width = 4 ft Bottom scale = 3 Channel scale = 1 ----- Mixing Zone Predictions @ 7Q10 Depth = .1534 ft Length = 69.35 ft Velocity = .3506 ft/sec Residence Time = .0023 days Recommendation: A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used. ----- Mixing Zone Predictions @ 30Q10 Depth = .1579 ft Length = 67.71 ft Velocity = .3573 ft/sec Residence Time = .0022 days Recommendation: A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used. ----- Mixing Zone Predictions @ 1Q10 Depth = .15 ft Length = 70.75 ft Velocity = .3457 ft/sec Residence Time = .0569 hours Recommendation: A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.	Effluent Flow = 0.15 MGD Stream 7Q10 = 0.049 MGD Stream 30Q10 = 0.056 MGD Stream 1Q10 = 0.044 MGD Stream slope = 0.009 ft/ft Stream width = 4 ft Bottom scale = 3 Channel scale = 1 ----- Mixing Zone Predictions @ 7Q10 Depth = .1916 ft Length = 56.95 ft Velocity = .4018 ft/sec Residence Time = .0016 days Recommendation: A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used. ----- Mixing Zone Predictions @ 30Q10 Depth = .1958 ft Length = 55.88 ft Velocity = .4071 ft/sec Residence Time = .0016 days Recommendation: A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used. ----- Mixing Zone Predictions @ 1Q10 Depth = .1885 ft Length = 57.82 ft Velocity = .398 ft/sec Residence Time = .0404 hours Recommendation: A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

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APPENDIX B

EFFLUENT SCREENING AND EFFLUENT LIMITATIONS

EFFLUENT LIMITATIONS

A comparison of technology and water quality-based limits was performed and the most stringent limits were selected, as summarized in the table below.

Outfall 001

Final Limits

Permitted Flow Tier: 0.09 MGD

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Avg.		Maximum		Frequency	Sample Type
Flow (MGD)	1	NL		NL		Continuous	TIRE
-----	-----	Monthly Avg.		Weekly Avg.		-----	-----
BOD ₅	3,5	20 mg/L	6.8 kg/d	30 mg/L	10 kg/d	1/Week	4 HC
TSS	6	30 mg/L	10 kg/d	45 mg/L	15 kg/d	1/Month	4 HC
Ammonia-N	3	4.0		5.3		1/Week	4 HC
Effluent Chlorine (TRC)(mg/L)*	3	0.011		0.013		3/Day at 4 hr intervals	Grab
E. coli (N/100 mL) (geometric mean)	3	126		NA		4/Month 10 am to 4 pm	Grab
-----	-----	Minimum		Maximum		-----	-----
pH (S.U.)	3	6.5		9.5		1/Day	Grab
Dissolved Oxygen (mg/L)	3,5	5.5		NA		1/Day	Grab
Contact Chlorine (TRC)(mg/L)*	3,4	1.0		NA		3/Day at 4 hr intervals	Grab

NL = No Limitation, monitoring required

NA = Not Applicable

TIRE = Totalizing, Indicating, and Recording equipment

4HC = 4-Hour Composite

4/Month = 4 samples taken during the calendar month, no less than 7 days apart

* = Applicable only when chlorination is used for disinfection

BASIS DESCRIPTIONS

1. VPDES Permit Regulation (9 VAC 25-31)
2. Federal Effluent Requirements (Secondary Treatment Regulation - 40CFR133)
3. Water Quality Standards (9 VAC 25-260)
4. Best Professional Judgment (BPJ)
5. Regional Stream Model

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Outfall 001

Final Limits

Design Flow: 0.15 MGD

PARAMETER	BASIS FOR LIMITS	EFFLUENT LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Avg.		Maximum		Frequency	Sample Type
Flow (MGD)	1	NL		NL		Continuous	TIRE
-----	-----	Monthly Avg.		Weekly Avg.		-----	-----
BOD ₅	3,5	20 mg/L	11 kg/d	30 mg/L	17 kg/d	1/Week	8 HC
TSS	6	30 mg/L	17 kg/d	45 mg/L	26 kg/d	1/Month	8 HC
Ammonia-N	3	3.6		4.9		1/Week	8 HC
Effluent Chlorine (TRC)(mg/L)*	3	0.010		0.011		3/Day at 4 hr intervals	Grab
E. coli (N/100 mL) (geometric mean)	3	126		NA		4/Month 10 am to 4 pm	Grab
-----	-----	Minimum		Maximum		-----	-----
Whole Effluent Toxicity (TUc)	3	NA		1.92		1/Quarter	8 HC
pH (S.U.)	3	6.5		9.5		1/Day	Grab
Dissolved Oxygen (mg/L)	3,5	5.5		NA		1/Day	Grab
Contact Chlorine (TRC)(mg/L)*	3,4	1.0		NA		3/Day at 4 hr intervals	Grab

NL = No Limitation, monitoring required

NA = Not Applicable

TIRE = Totalizing, Indicating, and Recording equipment

8 HC = 8-Hour Composite

4/Month = 4 samples taken during the calendar month, no less than 7 days apart

1/Quarter = Quarterly sampling with the results submitted with the DMR due January 10th, April 10th, July 10th and October 10th of each year.

* = Applicable only when chlorination is used for disinfection

BASIS DESCRIPTIONS

1. VPDES Permit Regulation (9 VAC 25-31)
2. Federal Effluent Requirements (Secondary Treatment Regulation - 40CFR133)
3. Water Quality Standards (9 VAC 25-260)
4. Best Professional Judgment (BPJ)
5. Regional Stream Model

Fact Sheet – VPDES Permit No. VA0022322 – Mt. Sidney WWTP

LIMITING FACTORS – OVERVIEW:

The following potential limiting factors have been considered in developing this permit and fact sheet:

Water Quality Management Plan Regulation (WQMP) (9 VAC 25-720)	
A. TMDL limits	E. coli
B. Non-TMDL WLAs	None
C. CBP (TN & TP) WLAs	TN and TP via GP VAN010092
Federal Effluent Guidelines	BOD₅, TSS, pH
BPJ/Agency Guidance limits	TRC (contact)
Water Quality-based Limits - numeric	BOD₅, DO, TRC (effluent), E. coli, pH, Ammonia-N
Water Quality-based Limits - narrative	None
Technology-based Limits (9 VAC 25-40-70)	None
Whole Effluent Toxicity (WET)	See Appendix D
Storm Water Limits	Approved NEC

EVALUATION OF THE EFFLUENT – CONVENTIONAL POLLUTANTS:

This discharge is included in the Christians Creek/Middle River DO model maintained by the DEQ-Valley Regional Office, which is available for review by visitation or electronically upon request.

The DO model demonstrated that the values shown below are protective at the 0.15 MGD flow tier and are also considered to be protective at the 0.09 MGD permitted flow tier.

cBOD ₅	=	20 mg/L
TKN	=	6.6 mg/L
DO	=	5.5 mg/L

The cBOD₅ limit was used in the previous reissuance. At this reissuance the permittee requested a BOD₅ limit instead of the cBOD₅. A BOD₅ limit of 20 mg/L has been included at this reissuance. DO limits have been carried forward from the previous permit for the 0.15 MGD flow tier and have been imposed at this reissuance for the 0.09 MGD flow tier. An evaluation of the facility's records for the previous 3 years indicates that the effluent BOD₅ concentration is averaging less than 25% of the monthly average limit; therefore, a reduction in monitoring frequency is warranted for both flow tiers – from a frequency of 3 Days/Week to a frequency of 1/Week.

Because the modeled effluent TKN was more than two times the Ammonia-N WLA, it was determined that no TKN limits were needed because the Ammonia-N limits imposed in this permit will control TKN.

The TSS limits are consistent with the Secondary Treatment Regulation and have been carried forward from the previous permit.

The pH limits reflect the current WQS for pH in the receiving stream and have been carried forward from the previous permit.

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EVALUATION OF THE EFFLUENT – DISINFECTION:

E. coli limits which are consistent with the TMDL WLA of 2.61×10^{11} cfu/yr and are protective of current WQC in the receiving stream have been carried forward from the previous permit for the 0.15 MGD flow tier and have been imposed at this reissuance for the 0.09 MGD flow tier. Mt. Sidney WWTP currently utilizes UV disinfection. The monitoring frequency for E. coli has been set at 4/Month based on past performance and is applicable regardless of the disinfection method to ensure effective disinfection is achieved. In accordance with the current VPDES Permit Manual, the TRC contact and TRC effluent monitoring frequencies have been increased from 1/Day to 3/Day for the 0.15 MGD flow tier and have been established as 3/Day for the 0.09 MGD flow tier.

EVALUATION OF THE EFFLUENT – NUTRIENTS:

In accordance with § 62.1-44.19:14.C.5. of the Code of Virginia, this Significant Discharger has submitted a Registration Statement and DEQ has recognized that they are covered under the General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia (9 VAC 25-820-10 *et seq.*). The effective date of coverage is January 1, 2007. Coverage under the GP will expire December 31, 2011.

The WLAs that are established in 9 VAC 25-820-70 based on the 0.15 MGD design flow are TN = 8,543 lbs/yr and TP = 1,142 lbs/yr.

The Augusta County Service Authority has indicated that Mt. Sidney WWTP will be “bubbled” with their other facilities. ASCA will address load increases associated with new or expanded discharges from this facility by managing the aggregate delivered load discharged from all of the facilities under common ownership or operation in the Potomac-Shenandoah watershed.

Upon issuance of a CTC for an expanded facility, DEQ staff shall initiate modification or, alternatively, revocation and reissuance, of this permit to include annual concentration limits based on the nutrient removal technology listed in the CTC. Upon issuance of a CTO, any nutrient removal facilities installed shall be operated to achieve the design TN and TP concentrations.

EVALUATION OF THE EFFLUENT – TOXICS:

WQS-WLA Spreadsheet Data

Stream: Water quality data for the receiving stream were obtained from Ambient Monitoring Station No. 1BMDL001.83 on Middle River located downstream of the discharge point. A Flow Frequency Determination for the receiving stream was generated April 1, 2011, and is included in Appendix A. The

Stream Information			
90% Annual Temp (°C) =	24.7	90% pH (SU) =	8.5
Mean Hardness (mg/L) =	191	10% pH (SU) =	7.8

All toxic pollutants, including Ammonia-N and TRC, are assumed absent in the receiving stream because there are no data for these parameters directly above the discharge.

Discharge: The pH and temperature values were obtained from the daily operational data submitted by the permittee. No new hardness data were available so the previously used value was carried forward.

Effluent Information			
90% Annual Temp (°C) =	25.0	90% pH (SU) =	7.3
Mean Hardness (mg/L) =	188	10% pH (SU) =	6.8

Fact Sheet – VPDES Permit No. VA0022322 – Mt. Sidney WWTP

WQC and WLAs were calculated for the WQS parameters for which data are available. The resulting WQC and WLAs are presented in this appendix. Current agency guidelines recommends the evaluation of toxic pollutant limits for TRC and Ammonia-N be based on default effluent concentrations of 20 mg/L and 9 mg/L, respectively. The effluent data were analyzed per the protocol for evaluation of effluent toxic pollutants included in this appendix with the following results:

- ? TRC: More stringent limits were determined to be necessary. This change is due to an increase in the monitoring frequency from 1/Day to 3/Day. The facility currently utilizes UV disinfection; therefore, no compliance schedule has been included to meet the more stringent limits.
- ? Ammonia-N: More stringent Ammonia-N limits have been determined to be necessary. An evaluation of the facility's records for the previous 3 years indicates that the effluent Ammonia-N concentration is averaging less than 25% of the monthly average limit; therefore, no compliance schedule has been included to meet the more stringent limits and a reduction in monitoring frequency is warranted for both flow tiers – from a frequency of 3 Days/Week to a frequency of 1/Week.

PROTOCOL FOR THE EVALUATION OF THE EFFLUENT – TOXIC POLLUTANTS

Toxic pollutants were evaluated in accordance with OWP Guidance Memo No. 00-2011. Acute and Chronic Waste Load Allocations (WLA_a and WLA_c) were analyzed according to the protocol below using a statistical approach (STAT.exe) to determine the necessity and magnitude of limits. Human Health Waste Load Allocations (WLA_{hh}) were analyzed according to the same protocol through a simple comparison with the effluent data. If the WLA_{hh} exceeded the effluent datum or data mean, no limits were required. If the effluent datum or data mean exceeded the WLA_{hh} , the WLA_{hh} was imposed as the limit. Since there are no data available immediately upstream of this discharge, all other upstream (background) pollutant concentrations are assumed to be "0".

The steps used in evaluating the effluent data are as follows:

- A. If all data are reported as "below detection" or $<$ the required Quantification Level (QL), and at least one detection level is $=$ the required QL, then the pollutant is considered to be not significantly present in the discharge and no further monitoring is required.
- B. If all data are reported as "below detection", and all detection levels are $>$ the required QL, then an evaluation is performed in which the pollutant is assumed present at the lowest reported detection level.
 - B.1. If the evaluation indicates that no limits are needed, then the existing data set is adequate and no further monitoring is required.
 - B.2. If the evaluation indicates that limits are needed, then the existing data set is inadequate to make a determination and additional monitoring is required.
- C. If any data value is reported as detectable at or above the required QL, then the data are adequate to determine whether effluent limits are needed.
 - C.1. If the evaluation indicates that no limits are needed, then no further monitoring is required.
 - C.2. If the evaluation indicates that limits are needed, then the limits and associated requirements are specified in the draft permit.
 - C.3. If the evaluation indicates that limits are needed, but the metals data are reported as a form other than "Dissolved", then the existing data set is inadequate to make a determination and additional monitoring is required.

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TOXLARGE

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
METALS					
Antimony, dissolved	7440-36-0	0.2	Previously evaluated. No further monitoring required.	---	---
Arsenic, dissolved	7440-38-2	1.0	<5	a	B.1
Barium, dissolved	7440-39-3	---	Applicable to PWS waters only	---	---
Cadmium, dissolved	7440-43-9	0.3	Previously evaluated. No further monitoring required.	---	---
Chromium III, dissolved	16065-83-1	0.5	Previously evaluated. No further monitoring required.	---	---
Chromium VI, dissolved	18540-29-9	0.5	Previously evaluated. No further monitoring required.	---	---
Chromium, Total	7440-47-3	---	Applicable to PWS waters only	---	---
Copper, dissolved	7440-50-8	0.5	Previously evaluated. No further monitoring required.	---	---
Iron, dissolved	7439-89-6	1.0	Applicable to PWS waters only	---	---
Lead, dissolved	7439-92-1	0.5	Previously evaluated. No further monitoring required.	---	---
Manganese, dissolved	7439-96-5	0.2	Applicable to PWS waters only	---	---
Mercury, dissolved	7439-97-6	1.0	Previously evaluated. No further monitoring required.	---	---
Nickel, dissolved	7440-02-0	0.5	Previously evaluated. No further monitoring required.	---	---
Selenium, total recoverable	7782-49-2	2.0	<2	a	A
Silver, dissolved	7440-22-4	0.2	Previously evaluated. No further monitoring required.	---	---
Thallium, dissolved	7440-28-0	---	<5	a	A
Zinc, dissolved	7440-66-6	2.0	Previously evaluated. No further monitoring required.	---	---
PESTICIDES/PCBS					
Aldrin ^C	309-00-2	0.05	Previously evaluated. No further monitoring required.	---	---
Chlordane ^C	57-74-9	0.2	Previously evaluated. No further monitoring required.	---	---
Chlorpyrifos	2921-88-2	(5)	Previously evaluated. No further monitoring required.	---	---
DDD ^C	72-54-8	0.1	Previously evaluated. No further monitoring required.	---	---
DDE ^C	72-55-9	0.1	Previously evaluated. No further monitoring required.	---	---
DDT ^C	50-29-3	0.1	Previously evaluated. No further monitoring required.	---	---
Demeton	8065-48-3	---	Previously evaluated. No further monitoring required.	---	---
Diazinon	333-41-5	---	New Requirement. Needs to be monitored.	---	---
2,4-Dichlorophenoxy acetic acid (synonym = 2,4-D)	94-75-7	---	Applicable to PWS waters only	---	---
Dieldrin ^C	60-57-1	0.1	Previously evaluated. No further monitoring required.	---	---
Alpha-Endosulfan	959-98-8	0.1	Previously evaluated. No further monitoring required.	---	---
Beta-Endosulfan	33213-65-9	0.1	Previously evaluated. No further monitoring required.	---	---
Alpha-Endosulfan + Beta-Endosulfan		---	Previously evaluated. No further monitoring required.	---	---
Endosulfan Sulfate	1031-07-8	0.1	Previously evaluated. No further monitoring required.	---	---
Endrin	72-20-8	0.1	Previously evaluated. No further monitoring required.	---	---
Endrin Aldehyde	7421-93-4	---	<0.05	a	A
Guthion	86-50-0	---	Previously evaluated. No further monitoring required.	---	---
Heptachlor ^C	76-44-8	0.05	Previously evaluated. No further monitoring required.	---	---
Heptachlor Epoxide ^C	1024-57-3	---	<0.05	a	A
Hexachlorocyclohexane Alpha-BHC ^C	319-84-6	---	<0.05	a	A
Hexachlorocyclohexane Beta-BHC ^C	319-85-7	---	<0.05	a	A
Hexachlorocyclohexane Gamma-BHC (synonym = Lindane)	58-89-9	---	Previously evaluated. No further monitoring required.	---	---

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Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
Kepone	143-50-0	---	Previously evaluated. No further monitoring required.	---	---
Malathion	121-75-5	---	Previously evaluated. No further monitoring required.	---	---
Methoxychlor	72-43-5	---	Previously evaluated. No further monitoring required.	---	---
Mirex	2385-85-5	---	Previously evaluated. No further monitoring required.	---	---
Parathion	56-38-2	---	Previously evaluated. No further monitoring required.	---	---
PCB Total ^C	1336-36-3	7.0	Previously evaluated. No further monitoring required.	---	---
Toxaphene ^C	8001-35-2	5.0	Previously evaluated. No further monitoring required.	---	---
2-(2,4,5-Trichlorophenoxy) propionic acid (synonym = Silvex)	93-72-1	---	Applicable to PWS waters only	---	---
Tributyltin	60-10-5	---	Previously evaluated. No further monitoring required.	---	---
BASE NEUTRAL EXTRACTABLES					
Acenaphthene	83-32-9	10.0	Previously evaluated. No further monitoring required.	---	---
Anthracene	120-12-7	10.0	Previously evaluated. No further monitoring required.	---	---
Benzidine ^C	92-87-5	---	<5	a	A
Benzo (a) anthracene ^C	56-55-3	10.0	Previously evaluated. No further monitoring required.	---	---
Benzo (b) fluoranthene ^C	205-99-2	10.0	Previously evaluated. No further monitoring required.	---	---
Benzo (k) fluoranthene ^C	207-08-9	10.0	Previously evaluated. No further monitoring required.	---	---
Benzo (a) pyrene ^C	50-32-8	10.0	Previously evaluated. No further monitoring required.	---	---
Bis 2-Chloroethyl Ether ^C	111-44-4	---	<5	a	A
Bis 2-Chloroisopropyl Ether	108-60-1	---	<5	a	A
Bis-2-Ethylhexyl Phthalate ^C	117-81-7	10.0	Previously evaluated. No further monitoring required.	---	---
Butyl benzyl phthalate	85-68-7	10.0	Previously evaluated. No further monitoring required.	---	---
2-Chloronaphthalene	91-58-7	---	<5	a	A
Chrysene ^C	218-01-9	10.0	Previously evaluated. No further monitoring required.	---	---
Dibenz(a,h)anthracene ^C	53-70-3	20.0	Previously evaluated. No further monitoring required.	---	---
1,2-Dichlorobenzene	95-50-1	10.0	Previously evaluated. No further monitoring required.	---	---
1,3-Dichlorobenzene	541-73-1	10.0	Previously evaluated. No further monitoring required.	---	---
1,4-Dichlorobenzene	106-46-7	10.0	Previously evaluated. No further monitoring required.	---	---
3,3-Dichlorobenzidine ^C	91-94-1	---	<5	a	A
Diethyl phthalate	84-66-2	10.0	Previously evaluated. No further monitoring required.	---	---
Dimethyl phthalate	131-11-3	---	<5	a	A
Di-n-Butyl Phthalate	84-74-2	10.0	Previously evaluated. No further monitoring required.	---	---
2,4-Dinitrotoluene	121-14-2	10.0	Previously evaluated. No further monitoring required.	---	---
1,2-Diphenylhydrazine ^C	122-66-7	---	<5	a	A
Fluoranthene	206-44-0	10.0	Previously evaluated. No further monitoring required.	---	---
Fluorene	86-73-7	10.0	Previously evaluated. No further monitoring required.	---	---
Hexachlorobenzene ^C	118-74-1	---	<5	a	A
Hexachlorobutadiene ^C	87-68-3	---	<5	a	A
Hexachlorocyclopentadiene	77-47-4	---	<5	a	A
Hexachloroethane ^C	67-72-1	---	<5	a	A
Indeno(1,2,3-cd)pyrene ^C	193-39-5	20.0	Previously evaluated. No further monitoring required.	---	---
Isophorone ^C	78-59-1	10.0	Previously evaluated. No further monitoring required.	---	---
Nitrobenzene	98-95-3	10.0	Previously evaluated. No further monitoring required.	---	---
N-Nitrosodimethylamine ^C	62-75-9	---	<5	a	A
N-Nitrosodi-n-propylamine ^C	621-64-7	---	<5	a	A

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Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
N-Nitrosodiphenylamine ^C	86-30-6	---	<5	a	A
Pyrene	129-00-0	10.0	Previously evaluated. No further monitoring required.	---	---
1,2,4-Trichlorobenzene	120-82-1	10.0	Previously evaluated. No further monitoring required.	---	---
VOLATILES					
Acrolein	107-02-8	---	<50	a	A
Acrylonitrile ^C	107-13-1	---	<50	a	A
Benzene ^C	71-43-2	10.0	Previously evaluated. No further monitoring required.	---	---
Bromoform ^C	75-25-2	10.0	Previously evaluated. No further monitoring required.	---	---
Carbon Tetrachloride ^C	56-23-5	10.0	Previously evaluated. No further monitoring required.	---	---
Chlorobenzene	108-90-7	50.0	Previously evaluated. No further monitoring required.	---	---
Chlorodibromomethane ^C	124-48-1	10.0	Previously evaluated. No further monitoring required.	---	---
Chloroform	67-66-3	10.0	Previously evaluated. No further monitoring required.	---	---
Dichlorobromomethane ^C	75-27-4	10.0	Previously evaluated. No further monitoring required.	---	---
1,2-Dichloroethane ^C	107-06-2	10.0	Previously evaluated. No further monitoring required.	---	---
1,1-Dichloroethylene	75-35-4	10.0	Previously evaluated. No further monitoring required.	---	---
1,2-trans-dichloroethylene	156-60-5	---	<5	a	A
1,2-Dichloropropane ^C	78-87-5	---	<5	a	A
1,3-Dichloropropene ^C	542-75-6	---	<5	a	A
Ethylbenzene	100-41-4	10.0	Previously evaluated. No further monitoring required.	---	---
Methyl Bromide	74-83-9	---	<5	a	A
Methylene Chloride ^C	75-09-2	20.0	Previously evaluated. No further monitoring required.	---	---
1,1,2,2-Tetrachloroethane ^C	79-34-5	---	<5	a	A
Tetrachloroethylene	127-18-4	10.0	Previously evaluated. No further monitoring required.	---	---
Toluene	10-88-3	10.0	Previously evaluated. No further monitoring required.	---	---
1,1,2-Trichloroethane ^C	79-00-5	---	<5	a	A
Trichloroethylene ^C	79-01-6	10.0	Previously evaluated. No further monitoring required.	---	---
Vinyl Chloride ^C	75-01-4	10.0	Previously evaluated. No further monitoring required.	---	---
RADIONUCLIDES					
Beta Particle & Photon Activity (mrem/yr)	N/A	---	Applicable to PWS waters only	---	---
Combined Radium 226 and 228 (pCi/L)	N/A	---	Applicable to PWS waters only	---	---
Gross Alpha Particle Activity (pCi/L)	N/A	---	Applicable to PWS waters only	---	---
Uranium	N/A	---	Applicable to PWS waters only	---	---
ACID EXTRACTABLES					
2-Chlorophenol	95-57-8	10.0	Previously evaluated. No further monitoring required.	---	---
2,4-Dichlorophenol	120-83-2	10.0	Previously evaluated. No further monitoring required.	---	---
2,4-Dimethylphenol	105-67-9	10.0	<5	a	A
2,4-Dinitrophenol	51-28-5	---	<20	a	A
2-Methyl-4,6-Dinitrophenol	534-52-1	---	<5	a	A
Pentachlorophenol ^C	87-86-5	50.0	Previously evaluated. No further monitoring required.	---	---
Phenol	108-95-2	10.0	Previously evaluated. No further monitoring required.	---	---
2,4,6-Trichlorophenol ^C	88-06-2	10.0	Previously evaluated. No further monitoring required.	---	---

Fact Sheet – VPDES Permit No. VA0022322 – Mt. Sidney WWTP

Parameter	CASRN	QL (ug/L)	Data (ug/L unless noted otherwise)	Source of Data	Data Eval
MISCELLANEOUS					
Ammonia-N (mg/L) (Annual)	766-41-7	0.2 mg/L	Default = 9 mg/L	b	C.2
Chloride (mg/L)	16887-00-6	---	Previously evaluated. No further monitoring required.	---	---
TRC (mg/L)	7782-50-5	0.1 mg/L	Default = 20 mg/L	b	C.2
Cyanide, Free	57-12-5	10.0	Previously evaluated. No further monitoring required.	---	---
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin)	1746-01-6	0.01	Applicable to Paper Mills & Oil Refineries only	---	---
Foaming Agents (as MBAS)	N/A	---	Applicable to PWS waters only	---	---
Hydrogen Sulfide	7783-06-4	---	Previously evaluated. No further monitoring required.	---	---
Nitrate as N (mg/L)	14797-55-8	---	Applicable to PWS waters only	---	---
Sulfate (mg/L)	N/A	---	Applicable to PWS waters only	---	---
Total Dissolved Solids (mg/L)	N/A	---	Applicable to PWS waters only	---	---

"Type" column indicates a category assigned to the referenced substance (see below):

A = Acid Extractable Organic Compounds

B = Base/Neutral Extractable Organic Compounds

M = Metals

n = PCBs

P = Pesticides

R = Radionuclides

V = Volatile Organic Compounds

X = Miscellaneous Compounds and Parameters

“Source of Data” codes:

a = permittee monitoring

b = default effluent concentration

"Data Evaluation" codes:

See section titled **PROTOCOL FOR THE EVALUATION OF EFFLUENT TOXIC POLLUTANTS** for an explanation of the code used.

CASRN = Chemical Abstract Service Registry Number for each parameter is referenced in the current Water Quality Standards. A unique numeric identifier designating only one substance. The Chemical Abstract Service is a division of the American Chemical Society.

The **superscript "C"** following the parameter name indicates that the substance is a known or suspected carcinogen; human health criteria at risk level 10^{-5} .

WOC-WLA SPREADSHEET INPUT – 0.09 MGD

WATER QUALITY CRITERIA / WASTE LOAD ALLOCATION ANALYSIS

Facility Name:

Mt. Sidney WWTP

Receiving Stream:
Middle River, UT

Permit No.: VA0022322

Date: 4/12/2011

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information	Stream Flows	Mixing Information	Effluent Information
Mean Hardness (as CaCO3) = 191 mg/L	1Q10 (Annual) = 0.044 MGD	Annual - 1Q10 Flow = 100 %	Mean Hardness (as CaCO3) = 188 mg/L
90% Temperature (Annual) = 24.7 deg C	7Q10 (Annual) = 0.049 MGD	- 7Q10 Flow = 100 %	90% Temp (Annual) = 25.0 deg C
90% Temperature (Wet season) = deg C	3Q10 (Annual) = 0.056 MGD	- 3Q10 Flow = 100 %	90% Temp (Wet season) = deg C
90% Maximum pH = 8.5 SU	1Q10 (Wet season) = MGD	Wet Season - 1Q10 Flow = %	90% Maximum pH = 7.3 SU
10% Maximum pH = 7.8 SU	3Q10 (Wet season) = MGD	- 3Q10 Flow = %	10% Maximum pH = 6.8 SU
Tier Designation = 2	3Q05 = 0.066 MGD		1992 Discharge Flow = 0.09 MGD
Public Water Supply (PWS) Y/N? = N	Harmonic Mean = 0.20 MGD		Discharge Flow for Limit Analysis = 0.09 MGD
V(alley) or P(iedmont)? = V			
Trout Present Y/N? = N			
Early Life Stages Present Y/N? = V			

Footnotes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise.
2. All flow values are expressed as Million Gallons per Day (MGD).
3. Discharge volumes are highest monthly average or 2C maximum for Industries and design flows for Municipals.
4. Hardness expressed as mg/L CaCO₃. Standards calculated using Hardness values in the range of 25-400 mg/L CaCO₃.
5. "Public Water Supply" protects for fish & water consumption. "Other Surface Waters" protects for fish consumption only.
6. Carcinogen "Y" indicates carcinogenic parameter.
7. Ammonia WQDS selected from separate tables, based on pH and temperature.
8. Metals measured as Dissolved, unless specified otherwise.
9. WLA = Waste Load Allocation, based on standards.
10. WLA is based on mass balances (less background, if data exist).
11. Acute - 1 day avg. concentration not to be exceeded more than 1/3 years.
12. Chronic - 4 hour avg. concentration (30 day avg. for Ammonia) not to be exceeded more than 1/3 years.
13. Mass balances employ 10:10 for Acute, 300:10 for Chronic Ammonia, 70:10 for Other Chronic, 300:5 for Non-chlorine, and Harmonic Mean for Carcinogens. Actual flows employed are a function of the mixing analysis and may be less than the actual flows.
14. Effluent Limitations are calculated elsewhere using the minimum WLA and EPA's statistical approach (Technical Support Document).

WQC-WLA SPREADSHEET OUTPUT – 0.09 MGD

Facility Name:

Mt. Sidney WWTP

Receiving Stream:

Middle River, UT

Permit No.:

VA0022322

Date:

4/8/2011

WATER QUALITY CRITERIA

0.09 MGD Discharge Flow - Mix per "Mixer"

Human Health

Aquatic Protection		Human Health	
Acute	Chronic	Public Water Supplies	Other Surface Waters
2.1E+01 mg/L	2.2E+00 mg/L	None	None
1.9E-02 mg/L	1.1E-02 mg/L	None	None

NON-ANTIDegradation Waste Load Allocations

0.09 MGD Discharge - Mix per "Mixer"

Aquatic Protection		Human Health
Acute	Chronic	
3.1E+01 mg/L	3.6E+00 mg/L	N/A
2.8E-02 mg/L	1.7E-02 mg/L	N/A

Fact Sheet – VPDES Permit No. VA0022322 – Mt. Sidney WWTP

WQC-WLA SPREADSHEET INPUT – 0.15 MGD

WATER QUALITY CRITERIA / WASTE LOAD ALLOCATION ANALYSIS

Facility Name:

Mt. Sidney WWTP

Receiving Stream:

Middle River, UT

Permit No.: VA0022322

Date: 4/12/2011

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information	Stream Flows	Mixing Information	Effluent Information
Mean Hardness (as CaCO ₃) = 191 mg/L	1Q10 (Annual) = 0.044 MGD	Annual - 1Q10 Flow = 100 %	Mean Hardness (as CaCO ₃) = 188 mg/L
90% Temperature (Annual) = 24.7 deg C	7Q10 (Annual) = 0.049 MGD	- 7Q10 Flow = 100 %	90% Temp (Annual) = 25.0 deg C
90% Temperature (Wet season) = deg C	30Q10 (Annual) = 0.056 MGD	- 30Q10 Flow = 100 %	90% Temp (Wet season) = deg C
90% Maximum pH = 8.5 SU	1Q10 (Wet season) = MGD	Wet Season - 1Q10 Flow = %	90% Maximum pH = 7.3 SU
10% Maximum pH = 7.8 SU	30Q10 (Wet season) = MGD	- 30Q10 Flow = %	10% Maximum pH = 6.8 SU
Tier Designation = 2	30Q5 = 0.066 MGD		1992 Discharge Flow = 0.15 MGD
Public Water Supply (PWS) Y/N? = N	Harmonic Mean = 0.20 MGD		Discharge Flow for Limit Analysis = 0.15 MGD
V(alley) or P(edmont)? = V			
Trout Present Y/N? = N			
Early Life Stages Present Y/N? = Y			

Footnotes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise.
- All flow values are expressed as Million Gallons per Day (MGD).
- Discharge volumes are highest monthly average or 2C maximum for Industries and design flows for Municipals.
- Hardness expressed as mg/l CaCO₃. Standards calculated using Hardness values in the range of 25-400 mg/l CaCO₃.
- "Public Water Supply" protects for fish & water consumption. "Other Surface Waters" protects for fish consumption only.
- Carcinogen "Y" indicates carcinogenic parameter.
- Ammonia WQGs selected from separate tables, based on pH and temperature.
- Metals measured as Dissolved, unless specified otherwise.
- WLA = Waste Load Allocation (based on standards).
- WLA = Waste Load Allocation (based on standards).
- WLAs are based on mass balances (less background, if data exist).
- Acute - 1 hour avg. concentration not to be exceeded more than 1/3 years.
- Chronic - 4 day avg. concentration (30 day avg. for Ammonia) not to be exceeded more than 1/3 years.
- Mass balances employ 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens, and Harmonic Mean for Carcinogens. Actual flows employed are a function of the mixing analysis and may be less than the actual flows.
- Effluent Limitations are calculated elsewhere using the minimum WLA and EPA's statistical approach (Technical Support Document).

WQC-WLA SPREADSHEET OUTPUT – 0.15 MGD

Facility Name:		Permit No.:		WATER QUALITY CRITERIA				NON-ANTIDEGRADATION			
Mt. Sidney WWTP		VA0022322		0.15 MGD Discharge Flow - Mix per "Mixer"				WASTE LOAD ALLOCATIONS			
Receiving Stream:		Date:						0.15 MGD Discharge - Mix per "Mixer"			
Middle River, UT		4/12/2011									
Toxic Parameter and Form	Carcinogen?	Aquatic Protection		Human Health		Aquatic Protection		Human Health			
		Acute	Chronic	Supplies	Waters	Acute	Chronic	Health			
Acrolein	N	None	None	6.1E+00	9.3E+00	N/A	N/A	1.3E+01			
Acrylonitrile	Y	None	None	5.1E-01	2.5E+00	N/A	N/A	5.8E+00			
Ammonia-N (Annual)	N	2.3E+01 mg/L	2.4E+00 mg/L	None	None	3.0E+01 mg/L	3.3E+00 mg/L	N/A			
Arsenic	N	3.4E+02	1.5E+02	1.0E+01	None	4.4E+02	2.0E+02	N/A			
Benzidine	Y	None	None	8.6E-04	2.0E-03	N/A	N/A	4.7E-03			
Bis2-Chloroethyl Ether	Y	None	None	3.0E-01	5.3E+00	N/A	N/A	1.2E+01			
Bis2-Chloroisopropyl Ether	N	None	None	1.4E+03	6.5E+04	N/A	N/A	9.4E+04			
Chlorine, Total Residual	N	1.9E-02 mg/L	1.1E-02 mg/L	None	None	2.5E-02 mg/L	1.5E-02 mg/L	N/A			
2-Chloronaphthalene	N	None	None	1.0E+03	1.6E+03	N/A	N/A	2.3E+03			
Diazinon	N	1.7E-01	1.7E-01	None	None	2.2E-01	2.3E-01	N/A			
3,3-Dichlorobenzidine	Y	None	None	2.1E-01	2.8E-01	N/A	N/A	6.5E-01			
1,2-trans-dichloroethylene	N	None	None	1.4E+02	1.0E+04	N/A	N/A	1.4E+04			
1,2-Dichloropropane	Y	None	None	5.0E+00	1.5E+02	N/A	N/A	3.5E+02			
1,3-Dichloropropene	Y	None	None	3.4E+00	2.1E+02	N/A	N/A	4.9E+02			
2,4 Dimethylphenol	N	None	None	3.8E+02	8.5E+02	N/A	N/A	1.2E+03			
Dimethyl Phthalate	N	None	None	2.7E+05	1.1E+06	N/A	N/A	1.6E+06			
2,4-Dinitrophenol	N	None	None	6.9E+01	5.3E+03	N/A	N/A	7.6E+03			
2-Methyl-4,6-Dinitrophenol	N	None	None	1.3E+01	2.8E+02	N/A	N/A	4.0E+02			
1,2-Diphenylhydrazine	Y	None	None	3.6E-01	2.0E+00	N/A	N/A	4.7E+00			
Endrin Aldehyde	N	None	None	2.9E-01	3.0E-01	N/A	N/A	4.3E-01			
Heptachlor Epoxide	Y	5.2E-01	3.8E-03	3.9E-04	3.9E-04	6.7E-01	5.0E-03	9.1E-04			
Hexachlorobenzene	Y	None	None	2.8E-03	2.9E-03	N/A	N/A	6.8E-03			
Hexachlorobutadiene	Y	None	None	4.4E+00	1.8E+02	N/A	N/A	4.2E+02			
Hexachlorocyclohexane Alpha-BHC	Y	None	None	2.6E-02	4.9E-02	N/A	N/A	1.1E-01			
Hexachlorocyclohexane Beta-BHC	Y	None	None	9.1E-02	1.7E-01	N/A	N/A	4.0E-01			
Hexachlorocyclopentadiene	N	None	None	4.0E+01	1.1E+03	N/A	N/A	1.6E+03			
Hexachloroethane	Y	None	None	1.4E+01	3.3E+01	N/A	N/A	7.7E+01			
Methyl Bromide	N	None	None	4.7E+01	1.5E+03	N/A	N/A	2.2E+03			
N-Nitrosodimethylamine	Y	None	None	6.9E-03	3.0E+01	N/A	N/A	7.0E+01			
N-Nitrosodiphenylamine	Y	None	None	3.3E+01	6.0E+01	N/A	N/A	1.4E+02			
N-Nitrosodi-n-propylamine	Y	None	None	5.0E-02	5.1E+00	N/A	N/A	1.2E+01			
Silver	N	1.0E+01	None	None	None	1.3E+01	N/A	N/A		N/A	
1,1,2,2-Tetrachloroethane	Y	None	None	1.7E+00	4.0E+01	N/A	N/A	9.3E+01			
Thallium	N	None	None	2.4E-01	4.7E-01	N/A	N/A	6.8E-01			

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STAT.EXE RESULTS – 0.09 MGD Flow Tier:

Ammonia-N	TRC	
Chronic averaging period = 30	Chronic averaging period = 4	
WLAa = 31	WLAa = 0.028	
WLAc = 3.6	WLAc = 0.017	
Q.L. = 0.2	Q.L. = 0.1	
# samples/mo. = 12	# samples/mo. = 90	
# samples/wk. = 3	# samples/wk. = 21	
Summary of Statistics:	Summary of Statistics:	
# observations = 1	# observations = 1	
Expected Value = 9	Expected Value = 20	
Variance = 29.16	Variance = 144	
C.V. = 0.6	C.V. = 0.6	
97th percentile daily values = 21.9007	97th percentile daily values = 48.6683	
97th percentile 4 day average = 14.9741	97th percentile 4 day average = 33.2758	
97th percentile 30 day average = 10.8544	97th percentile 30 day average = 24.1210	
# < Q.L. = 0	# < Q.L. = 0	
Model used = BPJ Assumptions, type 2 data	Model used = BPJ Assumptions, type 2 data	
A limit is needed based on Chronic Toxicity	A limit is needed based on Chronic Toxicity	
Maximum Daily Limit = 7.26361233629872	Maximum Daily Limit = 2.48637713289049E-02	
Average Weekly Limit = 5.31292348205901	Average Weekly Limit = 1.29468335167735E-02	
Average Monthly Limit = 3.95743357045276	Average Monthly Limit = 1.14331744343873E-02	
The data are: 9	The data are: 20	

STAT.EXE RESULTS – 0.15 MGD Flow Tier:

Ammonia-N	TRC	Arsenic, Dissolved
Chronic averaging period = 30	Chronic averaging period = 4	Chronic averaging period = 4
WLAa = 30	WLAa = 0.025	WLAa = 440
WLAc = 3.3	WLAc = 0.015	WLAc = 200
Q.L. = 0.2	Q.L. = 0.1	Q.L. = 1.0
# samples/mo. = 12	# samples/mo. = 90	# samples/mo. = 1
# samples/wk. = 3	# samples/wk. = 21	# samples/wk. = 1
Summary of Statistics:	Summary of Statistics:	Summary of Statistics:
# observations = 1	# observations = 1	# observations = 1
Expected Value = 9	Expected Value = 20	Expected Value = 5
Variance = 29.16	Variance = 144	Variance = 9
C.V. = 0.6	C.V. = 0.6	C.V. = 0.6
97th percentile daily values = 21.9007	97th percentile daily values = 48.6683	97th percentile daily values = 12.1670
97th percentile 4 day average = 14.9741	97th percentile 4 day average = 33.2758	97th percentile 4 day average = 8.31895
97th percentile 30 day average = 10.8544	97th percentile 30 day average = 24.1210	97th percentile 30 day average = 6.03026
# < Q.L. = 0	# < Q.L. = 0	# < Q.L. = 0
Model used = BPJ Assumptions, type 2 data	Model used = BPJ Assumptions, type 2 data	Model used = BPJ Assumptions, type 2 data
A limit is needed based on Chronic Toxicity	A limit is needed based on Chronic Toxicity	No Limit is required for this material
Maximum Daily Limit = 6.65831130827382	Maximum Daily Limit = 2.19386217607985E-02	
Average Weekly Limit = 4.87017985855409	Average Weekly Limit = 1.14236766324472E-02	
Average Monthly Limit = 3.62764743958169	Average Monthly Limit = 1.00880950891652E-02	
The data are: 9	The data are: 20	The data are: 5

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WET EVALUATION:

Applicability of TMP: Based upon current TMP guidance (GM No. 00-2012, 8/24/00), the following criteria are used to determine if the discharge qualifies as being subject to TMP requirements:

- It is a Publicly Owned treatment Works (POTW)
- It has an approved Pretreatment Program
- It has a design flow = 1.0 MGD
- It has industrial users classified as Significant Industrial Users or Categorical Industrial Users
- Deemed to have the potential to cause or contribute to instream toxicity

The design flow of Mt. Sidney WWTP is 0.15 MGD. Toxicity monitoring was required in the previous permit because of a Categorical Industrial User, Tyco Industries (metal finishing). The Tyco facility closed in 2009. If there had been no toxicity shown in the monitoring results, the TMP requirements would have been removed from the 2011 permit. The monitoring results have shown toxicity which cannot be attributed to the closing of the Tyco facility; therefore, TMP requirements have been included in the 2011 permit.

Design Flow: The previous permit contained requirements for a design flow tier of 0.15 MGD. The permit application dated March 29, 2011 requested an additional permitted flow tier of 0.09 MGD.

Summary of Toxicity Testing: Table 1 contains a summary of the chronic toxicity testing for *Pimephales promelas*. Table 2 contains a summary of the chronic toxicity testing for *Ceriodaphnia dubia*. An evaluation of the data was performed per TMP guidance.

Rationale for Acute versus Chronic Toxicity Testing: The previous fact sheet contained a discussion that the results of the acute and chronic testing during the permit term provided a basis for assuming that there is no reasonable potential for acute toxicity to be present at Outfall 001; therefore, the 2006 permit only contained chronic toxicity testing. Tables 1 and 2 show the 48-hour LC₅₀ with the chronic test results. All of the 48-hour LC 50 results are > 100%. This supports the conclusion to continue requiring only chronic toxicity testing rather than both acute and chronic toxicity testing.

Rationale for 1 Species: The permit was originally drafted to include quarterly toxicity testing of both *Ceriodaphnia dubia* and *Pimephales promelas*. Even though the toxicity testing for *Pimephales promelas* did not show any toxicity, testing was included because the Form 2A application required testing of 2 species for municipalities meeting the following criteria:

- POTWs with a design flow rate greater than or equal to 1.0 MGD
- POTWs with a pretreatment program
- POTWs required by the permitting authority to submit data for these parameters

During the draft permit review, the permittee requested that the toxicity testing for *Pimephales promelas* be removed from the permit because the fathead minnow tests did not exhibit any toxicity. The draft permit was modified to include toxicity testing of 1 species rather than 2. The permittee was reminded that when the Form 2A application is due in the future, the Authority will have to submit a waiver request for the toxicity testing no less than 210 days prior to the expiration date of the permit.

Testing Period:

0.09 MGD permitted flow: The testing period of July 1st to August 31st for conducting the annual toxicity testing was established in the previous permit. This testing period will be continued for the 0.09 MGD permitted flow tier.

0.015 MGD design flow: Because the 0.15 MGD design flow tier contains quarterly monitoring, no testing period is applicable.

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Sample Type: Composite samples are considered representative of discharge quality.

Evaluation of WLAs: The April 1, 2011 Flow Frequency Determination indicates the 7Q10 and 1Q10 of the receiving stream. The following acute and chronic WLAs were generated from the Department's WETlim10.xls spreadsheet by entering the design flow, stream flows, and stream mix percentages for the respective stream flows (See Tables 3 and 4):

	WLA _a	WLA _{a,c}	WLA _c
Permitted Flow = 0.09 MGD	0.4466667	4.4666667	1.5444444
Design Flow = 0.15 MGD	0.388	3.88	1.3266667

Notes: WLA_a = Acute WLA
WLA_{a,c} = Acute WLA expressed as chronic (WLA_a X 10)
WLA_c = Chronic WLA

The WLA was used in the Department's Stat.exe program in order to perform a statistical evaluation of the chronic test results expressed as Toxicity Units (TUs). As indicated in Tables 3 and 4, if the mean of the data exceeds a TU_c = 1.0, a limit may result using the Department's Stat.exe program.

Chronic Dilution Series – 0.09 MGD permitted flow: The recommended dilution series for the chronic tests is a 0.5 series starting at 100%.

Chronic Dilution Series – 0.15 MGD design flow:

Dilution Series:	27 %	38%	52%	73%	100%
TU _c :	3.7	2.63	1.92	1.37	1.0

Stat. exe Limit Evaluation – 0.09 MGD permitted flow: The toxicity test results for *Ceriodaphnia dubia* were entered into the Department's Stat.exe program to determine if WET limits were required. The results of the Stat.exe evaluation are shown in Table 6. The results of the evaluation indicate that no WET limit is required for *Ceriodaphnia dubia* at the permitted flow of 0.09 MGD. A Stat.exe evaluation was not performed on the *Pimephales promelas* toxicity testing data summarized in Table 1 because all of the test results were TU_c = 1.0.

Stat.exe Limit Evaluation – 0.15 MGD design flow: The toxicity test results for *Ceriodaphnia dubia* were entered into the Department's Stat.exe program to determine if WET limits were required. Based on an evaluation of the data, a chronic WET limit (TU_c) has been determined to be necessary and has been included in the permit. A four year compliance schedule has been included in the permit.

Peer Reviewer: Dawn Jeffries (07/12/11)

Table 1
Summary of Chronic Toxicity Testing – *Pimephales promelas*

Monitoring Period	Test Date	Chronic 7 - Day Static Renewal Survival and Growth <i>Pimephales promelas</i> (TU _c)		48-hr LC ₅₀
		Survival (TU _c)	Growth (TU _c)	
1st Annual (7/1/07 – 8/31/07)	8/7/07 – 8/13/07	1.0	1.0	> 100 %
2nd Annual (7/1/08 – 8/31/08)	8/12/08 – 8/18/08	1.0	1.0	> 100 %

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3rd Annual (7/1/09 – 8/31/09)	7/28/09 – 7/30/09	1.0	1.0	> 100 %
4th Annual (7/1/10 – 8/31/10)	8/17/10 – 8/24/10	1.0	1.0	> 100 %
5th Annual (7/1/11 – 8/31/11)	Test results not due yet.			

Table 2
Summary of Chronic Toxicity Testing – *Ceriodaphnia dubia*

Monitoring Period	Test Date	Chronic 3-Brood Static Renewal Survival and Reproduction <i>Ceriodaphnia dubia</i> (TUc)		48-hr LC ₅₀
		Survival (TUc)	Reproduction (TUc)	
1st Annual (7/01/07 – 8/31/07)	8/07/07	1.0	1.0	> 100 %
2nd Annual (7/01/08 – 8/31/08)	8/12/08	1.0	1.0	> 100 %
3rd Annual (7/01/09 – 8/31/09)	7/28/09	1.0	1.54	
4th Annual (7/01/10 – 8/31/10)	8/17/10 – 8/24/10	1.0	>1.79 (next dilution = 48.7 = TUc = 2.05	> 100 %
5th Annual (7/01/11 – 8/31/11)	Test results not due yet.			
Extra Testing	3/02/10 – 3/08/10	1.0	1.0	> 100 %
Extra Testing	6/08/10 – 6/13/10	1.0	1.0	> 100 %
Extra Testing	7/20/10 – 7/26/10	1.0	1.0	> 100 %
Extra Testing	12/07/10 – 12/14/10	1.0	1.0	>100 %
Extra Testing	12/14/10 – 12/21/10	1.0	1.0	>100 %
Extra Testing	1/04/11 – 1/11/11	1.0	1.0	>100 %

Table 3

Fact Sheet – VPDES Permit No. VA0022322 – Mt. Sidney WWTP

Spreadsheet for determination of WET test endpoints or WET limits									
Excel 97		Acute Endpoint/Permit Limit		Use as LC ₅₀ in Special Condition, as TU _a on DMR					
Revision Date: 01/10/05		ACUTE		100% =	NOAEC	LC ₅₀ =		NA	% Use as NA TU _a
File: WETLIM10.xls (MIX.EXE required also)		ACUTEWLA _a		0.4466667	Note: Inform the permittee that if the mean of the data exceeds this TU _a : 1.0 a limit may result using WLA.EXE				
		Chronic Endpoint/Permit Limit		Use as NOEC in Special Condition, as TU _c on DMR					
		CHRONIC		2.25886535	TU _c	NOEC =		45 % Use as	2.22 TU _c
		BOTH*		4.46666678	TU _c	NOEC =		23 % Use as	4.34 TU _c
		AML		2.25886535	TU _c	NOEC =		45 % Use as	2.22 TU _c
Enter data in the cells with blue type:		ACUTE WLA _{a,c}		4.4666667	Note: Inform the permittee that if the mean of the data exceeds this TU _c : 1.0 a limit may result using WLA.EXE				
		CHRONIC WLA _c		1.5444444	* Both means acute expressed as chronic				
Entry Date: 04/15/11		Plant Flow:		0.09	MGD	Difuser /modeling study?		Enter Y/N N	
Facility Name: Mt. Sidney WWTP		Acute 1Q10:		0.044	MGD	Acute		1 :1	
VPDES Number: VA0022322		Chronic 7Q10:		0.049	MGD	Chronic		1 :1	
Outfall Number: 001		% Flow to be used from MIX.EXE							
				100	%				
				100	%				
Are data available to calculate CV? (Y/N)		N		(Minimum of 10 data points, same species, needed)				Go to Page 2	
Are data available to calculate ACR? (Y/N)		N		(NOEC<LC50, do not use greater/less than data)				Go to Page 3	
IWC _a		67.1641791 %		Plant flow/plant flow + 1Q10		NOTE: If the IWC _a is >33%, specify the NOAEC = 100% test/endpoint for use			
IWC _c		64.74820144 %		Plant flow/plant flow + 7Q10					
Dilution, acute		1.488888889		100/IWC _a					
Dilution, chronic		1.544444444		100/IWC _c					
WLA _a		0.446666667		Instream criterion (0.3 TU _a) X's Dilution, acute					
WLA _c		1.544444444		Instream criterion (1.0 TU _c) X's Dilution, chronic					
WLA _{a,c}		4.466666667		ACR X's WLA _a - converts acute WLA to chronic units					
ACR -acute/chronic ratio		10		LC50/NOEC (Default is 10 - if data are available, use tables Page 3)					
CV-Coefficient of variation		0.6		Default of 0.6 - if data are available, use tables Page 2)					
Constants eA		0.4109447		Default = 0.41					
eB		0.6010373		Default = 0.60					
eC		2.4334175		Default = 2.43					
eD		2.4334175		Default = 2.43 (1 samp)		No. of sample 1			
						**The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTA _{a,c} and MDL using it are driven by the ACR.			
LTA _{a,c}		1.835552993		WLA _{a,c} X's eA					
LTA _c		0.928268719		WLA _c X's eB		Rounded NOEC's %			
MDL** with LTA _{a,c}		4.466666776		TU _c		NOEC =		22.388059	(Protects from acute/chronic toxicity) NOEC = 23 %
MDL** with LTA _c		2.258865345		TU _c		NOEC =		44.270014	(Protects from chronic toxicity) NOEC = 45 %
AML with lowest LTA		2.258865345		TU _c		NOEC =		44.270014	Lowest LTA X's eD NOEC = 45 %
IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU _c to TU _a									
MDL with LTA _{a,c}		0.446666678		TU _a		LC50 =		223.880592	% Use NOAEC=100% Rounded LC50's %
MDL with LTA _c		0.225886535		TU _a		LC50 =		442.700138	% Use NOAEC=100% LC50 = NA %

ADJUSTED DILUTION SERIES TO RECOMMEND					
0.09 MGD Flow Tier			Monitoring		Limit
			% Effluent	TU _c	% Effluent TU _c
Dilution series based on data mean			100	1.000000	
Dilution series to use for limit					45 2.22
Dilution factor to recommend:			0.5		0.670820393
Dilution series to recommend:			100.0	1.00	100.0 1.00
			50.0	2.00	67.1 1.49
			25.0	4.00	45.0 2.22
			12.5	8.00	30.2 3.31
			6.3	16.00	20.3 4.94
Extra dilutions if needed			3.12	32.05	13.58 7.36
			1.56	64.10	9.11 10.97

Table 4

Fact Sheet – VPDES Permit No. VA0022322 – Mt. Sidney WWTP

Spreadsheet for determination of WET test endpoints or WET limits									
Excel 97		Acute Endpoint/Permit Limit		Use as LC ₅₀ in Special Condition, as TU _a on DMR					
Revision Date: 01/10/05		ACUTE		100% =	NOAEC	LC ₅₀ =		NA	% Use as NA TU _a
File: WETLIM10.xls		ACUTEWLA _a		0.388	Note: Inform the permittee that if the mean of the data exceeds this TU _a : 1.0 a limit may result using WLA.EXE				
(MIX.EXE required also)		Chronic Endpoint/Permit Limit		Use as NOEC in Special Condition, as TU _c on DMR					
		CHRONIC		1.94034908	TU _c	NOEC =		52 % Use as	1.92 TU _c
		BOTH*		3.8800001	TU _c	NOEC =		26 % Use as	3.84 TU _c
		AML		1.94034908	TU _c	NOEC =		52 % Use as	1.92 TU _c
Enter data in the cells with blue type:		ACUTE WLA _{a,c}		3.88	Note: Inform the permittee that if the mean of the data exceeds this TU _c : 1.0 a limit may result using WLA.EXE				
		CHRONIC WLA _c		1.3266667	* Both means acute expressed as chronic				
Entry Date: 04/15/11		Plant Flow:		0.15	MGD	Difuser /modeling study?		Enter Y/N N	
Facility Name: Mt. Sidney WWTP		Acute 1Q10:		0.044	MGD	Acute		1 :1	
VPDES Number: VA0022322		Chronic 7Q10:		0.049	MGD	Chronic		1 :1	
Outfall Number: 001		% Flow to be used from MIX.EXE							
				100	%				
				100	%				
Are data available to calculate CV? (Y/N)		N		(Minimum of 10 data points, same species, needed)				Go to Page 2	
Are data available to calculate ACR? (Y/N)		N		(NOEC<LC50, do not use greater/less than data)				Go to Page 3	
IWC _a		77.31958763 %		Plant flow/plant flow + 1Q10		NOTE: If the IWC _a is >33%, specify the NOAEC = 100% test/endpoint for use			
IWC _c		75.37688442 %		Plant flow/plant flow + 7Q10					
Dilution, acute		1.293333333		100/IWC _a					
Dilution, chronic		1.326666667		100/IWC _c					
WLA _a		0.388		Instream criterion (0.3 TU _a) X's Dilution, acute					
WLA _c		1.326666667		Instream criterion (1.0 TU _c) X's Dilution, chronic					
WLA _{a,c}		3.88		ACR X's WLA _a - converts acute WLA to chronic units					
ACR -acute/chronic ratio		10		LC50/NOEC (Default is 10 - if data are available, use tables Page 3)					
CV-Coefficient of variation		0.6		Default of 0.6 - if data are available, use tables Page 2)					
Constants eA		0.4109447		Default = 0.41					
eB		0.6010373		Default = 0.60					
eC		2.4334175		Default = 2.43					
eD		2.4334175		Default = 2.43 (1 samp)					
		No. of sample		1		**The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTA _{a,c} and MDL using it are driven by the ACR.			
LTA _{a,c}		1.594465436		WLA _{a,c} X's eA					
LTA _c		0.797376151		WLA _c X's eB		Rounded NOEC's %			
MDL** with LTA _{a,c}		3.880000095		TU _c		NOEC =		25.773195	(Protects from acute/chronic toxicity) NOEC = 26 %
MDL** with LTA _c		1.940349081		TU _c		NOEC =		51.537118	(Protects from chronic toxicity) NOEC = 52 %
AML with lowest LTA		1.940349081		TU _c		NOEC =		51.537118	Lowest LTA X's eD NOEC = 52 %
IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU _c to TU _a									
MDL with LTA _{a,c}		0.38800001		TU _a		LC50 =		257.731952	% Use NOAEC=100% Rounded LC50's %
MDL with LTA _c		0.194034908		TU _a		LC50 =		515.371182	% Use NOAEC=100% LC50 = NA %

ADJUSTED DILUTION SERIES TO RECOMMEND					
0.15 MGD Flow Tier			Monitoring	Limit	
			% Effluent	TU _c	% Effluent TU _c
Dilution series based on data mean			100	1.000000	
Dilution series to use for limit					52 1.92
Dilution factor to recommend:			0.5		0.721110255
Dilution series to recommend:			100.0	1.00	100.0 1.00
			50.0	2.00	72.1 1.39
			25.0	4.00	52.0 1.92
			12.5	8.00	37.5 2.67
			6.3	16.00	27.0 3.70
Extra dilutions if needed			3.12	32.05	19.50 5.13
			1.56	64.10	14.06 7.11

Table 5

Fact Sheet – VPDES Permit No. VA0022322 – Mt. Sidney WWTP

Stat.exe Output

<p>Facility = Mt. Sidney WWTP - 0.09 MGD Chemical = WET Cd Chronic Chronic averaging period = 4 WLAa = 4.4666667 WLAc = 1.5444444 Q.L. = 1 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics:</p> <p># observations = 10 Expected Value = 1.15789 Variance = .087590 C.V. = 0.255598 97th percentile daily values = 1.80066 97th percentile 4 day average = 1.45924 97th percentile 30 day average = 1.25953 # < Q.L. = 0 Model used = lognormal</p> <p>No Limit is required for this material</p> <p>The data are:</p> <p>1 1 1.54 2.05 1 1 1 1 1 1 1</p>	<p>Facility = Mt. Sidney WWTP - 0.15 MGD Chemical = WET Cd Chronic Chronic averaging period = 4 WLAa = 3.88 WLAc = 1.3266667 Q.L. = 1 # samples/mo. = 1 # samples/wk. = 1</p> <p>Summary of Statistics:</p> <p># observations = 10 Expected Value = 1.15789 Variance = .087590 C.V. = 0.255598 97th percentile daily values = 1.80066 97th percentile 4 day average = 1.45924 97th percentile 30 day average = 1.25953 # < Q.L. = 0 Model used = lognormal</p> <p>A limit is needed based on Chronic Toxicity Maximum Daily Limit = 1.63706424321959 Average Weekly Limit = 1.63706424321959 Average Monthly Limit = 1.63706424321959</p> <p>The data are:</p> <p>1 1 1.54 2.05 1 1 1 1 1 1 1</p> <p>Note: The WET limit of 1.92 is taken from Table 4 rather than the WET limit of 1.63 shown in Table 5. The reason why there is a large difference is that there are = 10 data points which results in a different Coefficient of Variation rather than the default of 0.6 which is normally used.</p>
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APPENDIX C

BASES FOR PERMIT SPECIAL CONDITIONS

Tabulated below are the sections of the permit, with any changes and the reasons for the changes identified. Also provided is the basis for each of the permit special conditions.

Cover Page	<ul style="list-style-type: none">• Content and format as prescribed by the VPDES Permit Manual.
Part I.A.1.	Effluent Limitations and Monitoring Requirements – 0.09 MGD Permitted Flow Tier: <i>New requirement.</i> Bases for effluent limits provided in previous pages of this fact sheet. Monitoring requirements as prescribed by the VPDES Permit Manual.
Part I.A.2.	Effluent Limitations and Monitoring Requirements: <i>Updates Part I.A.1. of the previous permit with the following:</i> <ul style="list-style-type: none">• Changes were made to the format and introductory language.• More stringent Ammonia-N limits were included.• More stringent TRC limits were included.• The monitoring frequency for E. coli was changed to 4/Month. The E. coli limit and monitoring are applicable regardless of the disinfection method utilized.• Footnotes were updated to reflect current DEQ guidance and changes in the reissued permit.
Part I.B.	TRC Effluent Limitations and Monitoring Requirements: <i>Updates Part I.B. of the previous permit.</i> Required by Sewage Collection and Treatment (SCAT) Regulations and 9 VAC 25-260-170, Bacteria; other waters. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. This ensures proper operation of chlorination equipment to maintain adequate disinfection.
Part I.C.	Effluent Limitations and Monitoring Requirements – Additional Instructions: <i>Updates Part I.D. of the previous permit.</i> Authorized by VPDES Permit Regulation, 9 VAC 25-31-190.J.4 and 220.I. This condition is necessary when a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values.
Part I.D.	Pretreatment Program Requirements: <i>Updates Part I.D. of the previous permit.</i> VPDES Permit Regulation, 9 VAC 25-31-730 through 900, and 40 CFR part 403 require certain existing and new sources of pollution to meet specified regulations.
Part I.E.	Whole Effluent Toxicity (WET) Requirements: <i>Updates Part I.E. of the previous permit.</i> VPDES Permit Regulation, 9 VAC 25-31-210 and 220 I, requires monitoring in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act.
Part I.F.1.	95% Capacity Reopener: <i>Identical to Part I.F.1. of the previous permit.</i> Required by VPDES Permit Regulation, 9 VAC 25-31-200 B 4 for certain permits.
Part I.F.2.	Indirect Dischargers: <i>Identical to Part I.F.2. of the previous permit.</i> Required by VPDES Permit Regulation, 9 VAC 25-31-200 B 1 for all STPs that receive waste from someone other than the owner of the treatment works.
Part I.F.3.	Materials Handling/Storage: <i>Identical to Part I.F.3. of the previous permit.</i> 9 VAC 25-31-280.B.2. requires that the types and quantities of “wastes, fluids, or pollutants which are ... treated, stored, etc.” be addressed for all permitted facilities.

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- Part I.F.4. **O&M Manual Requirement:** *Updates Part I.F.4. of the previous permit.* Required by Code of Virginia 62.1-44.19, SCAT Regulations 9 VAC 25-790, and VPDES Permit Regulation 9 VAC 25-31-190 E for all STPs. Added requirement to describe procedures for documenting compliance with the permit requirement that there shall be no discharge of floating solids or visible foam in other than trace amounts.
- Part I.F.5. **CTC/CTO Requirement:** *Identical to Part I.F.5. of the previous permit.* Required by Code of Virginia 62.1-44.19, SCAT Regulations 9 VAC 25-790, and VPDES Permit Regulation 9 VAC 25-31-190 E for all STPs.
- Part I.F.6. **SMP Requirement:** *Updates Part I.G.1. and Part I.G.3. of the previous permit.* VPDES Permit Regulation 9 VAC 25-31-100 P, 220 B 2, and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on their sludge use and disposal practices and to meet specified standards for sludge use and disposal. Technical requirements are derived from the Virginia Pollution Abatement Permit Regulation (9 VAC 25-32-10 *et seq.*)
- Part I.F.7. **Licensed Operator Requirement:** *Identical to Part I.F.6. of the previous permit.* The VPDES Permit Regulation 9 VAC 25-31-200 C, the Code of Virginia 54.1-2300 *et seq.*, and Rules and Regulations for Waterworks and Wastewater Works Operators 18 VAC 160-20-10 *et seq.*, require licensure of operators. A Class III license is indicated for this facility.
- Part I.F.8. **Reliability Class:** *Identical to Part I.F.7. of the previous permit.* Required by SCAT Regulations 9 VAC 25-790. Class II status was assigned to this facility on October 8, 1979.
- Part I.F.9. **Water Quality Criteria Monitoring:** *Updates Part I.F.8. of the previous permit.* State Water Control Law at 62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. States are required to review data on discharges to identify actual or potential toxicity problems, or the attainment of water quality goals, according to 40 CFR Part 131, Water Quality Standards, subpart 131.11. To ensure that water quality criteria are maintained, the permittee is required to analyze the facility's effluent for the substances noted in Attachment A of this VPDES permit.
- Part I.F.10. **Treatment Works Closure Plan:** *Updates Part I.F.9. of the previous permit.* Required for all STPs per the State Water Control Law at 62.1-44.18.C. and 62.1-44.15:1.1., and the SCAT Regulations at 9 VAC 25-790-450.E. and 9 VAC 25-790-120.E.3.
- Part I.F.11. **Reopeners:**
a. *New Requirement:* Section 303(d) of the Clean Water Act requires that total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act.
b. *New Requirement:* 9 VAC 25-40-70 A authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade.
c. *Updates Part I.F.10. of the previous permit:* 9 VAC 25-31-390 A authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.
d. *Updates Part I.G.2. of the previous permit:* Required by the VPDES Permit Regulation, 9 VAC 25-31-220.C, for all permits issued to STPs.
- Part II **Conditions Applicable to All VPDES Permits:** *Identical to Part II of previous permit.* VPDES Permit Regulation 9 VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed

DELETIONS

Tabulated below are the sections of the previous permit that were deleted and the basis for this action.

Part I.A.2. (Sludge Monitoring Requirements) and Part I.G. (Sludge Reporting Requirements) were deleted at this reissuance because the information is duplicative of what is required to be monitored and reported under VPA Permit Nos. VPA01566, VPA01580, and VPA01581.